

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Animal Abstract

Element Code: ARADE03012

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CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Sistrurus catenatus edwardsii*

COMMON NAME: Desert Massasauga

SYNONYMS: *Crotalophorus catenatus edwardsii*; *Crotalophorus edwardsii*; *Crotalus milarius edwardsii*; *Crotalus edwardsii*; *Sistrurus catenatus tergeminus*

FAMILY: Serpentes: Crotalidae

AUTHOR, PLACE OF PUBLICATION: Baird and Girard. 1853. Catalogue of North American Reptiles in the Museum of the Smithsonian Institution. Part 1. Serpentes. Smithsonian Institution, Washington DC. p.15.

TYPE LOCALITY: Tamaulipas, Mexico. Type specimen USNM 507.

TYPE SPECIMEN: The holotype USNM 507 is presumed lost. USNM 506 from "Sonora, Mexico" collected by J.D. Graham and USNM 509 from "Tamaulipas, Mexico" collected by L.A. Edwards, were designated as syntypes (Cochran 1961, in Degenhardt et al. 1996).

TAXONOMIC UNIQUENESS: The genus *Sistrurus* contains three species. Of three subspecies of *S. catenatus*, only *S. c. edwardsii* occurs in Arizona.

DESCRIPTION: *S. c. edwardsii* is one of Arizona's smallest rattlesnakes (Lowe et al. 1986). The total length for the species ranges from 16-40.5 inches (40-100 cm; Stebbins 1985), but most adults in Arizona are under 18 inches in length (Lowe et al. 1986). The largest measured in Arizona is a male at 23.1 inches (588 mm) total length (Holycross 2001).

The desert massasauga has nine large plates on top of the head, and a conspicuous chocolate mask across the eyes and most of the face from snout to neck (Lowe et al. 1986). The ground color of large adults ranges from dark brown to dark gray, with 39-40 darker brown to blackish blotches down the middle of the back and three lateral rows of smaller, fainter, alternating spots (Stebbins 1985; Lowe et al. 1986). The belly is pale or whitish and often unmarked (Stebbins 1985) but is mottled with brown, gray-brown, and orange in Arizona specimens (Lowe et al. 1986). The dorsal scales are keeled, usually in 23 rows, and the anal plate is entire (Degenhardt et al. 1996; Ernst 1992). The young have a paler ground color, with a pattern more conspicuous than adults, and a yellowish white tail (Stebbins 1985).

AIDS TO IDENTIFICATION: Enlarged head scales and elongate head markings (extending onto neck) distinguish *S. c. edwardsii* from other Arizona rattlesnakes (Stebbins 1985).

ILLUSTRATIONS: Color drawing (Stebbins 1985: plate 45)
Color photo (Behler and King 1979: plate 632)
Color photo (Lowe et al. 1976:57)
Color photo (Campbell and Lamar 1989: figures 437-438)
Color photo (Degenhardt et al. 1996)

TOTAL RANGE: *S. catenatus* ranges from central New York (isolated populations) and southern Ontario south and southwest to northeastern Mexico, extreme southeastern Arizona and gulf coast of Texas (Ernst 1992; Degenhardt et al. 1996). *S. c. edwardsii* is found in disjunct populations in extreme southeast Arizona, southern New Mexico, and southeast Colorado, into northern Mexico (Stebbins 1985).

RANGE WITHIN ARIZONA: The desert massasauga is currently known from only two localized populations in extreme southeastern Arizona in San Bernardino and Sulphur Springs valleys and is very rare in the latter (Holycross and Douglas 1996; Rosen et al. 1996). Unsubstantiated records include a historical site at Fort Huachuca, sightings at "Hereford Crossing" areas on San Pedro and at Fairbanks School (Holycross and Douglas 1996; AGFD Heritage Data Management System, unpublished data).

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: This snake is primarily crepuscular and nocturnal and spends most of its time underground in rodent burrows or in the base of tobosa clumps, though occasionally it can be found under surface cover such as rocks, wood piles, and other litter (Holycross and Douglas 1996). In Arizona, it is active from April to October, with maximum activity during the summer rains. Most of these snakes are observed crossing roads during the early evening hours. If they are approached while crawling, they will usually flee rather than coil. When moving on smooth or sandy surfaces, they are fairly adept at "sidewinding" (Lowe et al. 1986).

No venom yield or toxicity data are available for *S. c. edwardsii* (Lowe et al. 1986). The eastern subspecies' venom is one of the most toxic for rattlesnakes, based on studies conducted in the 1930's and 1940's. Their venom is about 10 times more toxic than the Western Diamondback rattlesnake and almost as toxic as the Mojave Rattlesnake. The desert massasauga's small size and low venom yield, keep it from being more dangerous.

REPRODUCTION: Desert massasauga mate in both spring and fall, but mating has only been observed in captivity (Holycross and Douglas 1996; Lowe et al. 1986). Females probably do

not reproduce every year (Goldberg and Holycross 1999). Young are born in late summer to fall (Goldberg and Holycross 1999). Litter sizes range from four to eight young (Goldberg and Holycross 1999; Holycross and Douglas 1996), but broods of up to 19 young have been reported from a larger subspecies (Keenlyne 1978, in Ernst 1992). Newborns of the species as a whole range from 5.5 to 9.9 inches (140-252 mm) in total length (Ernst 1992).

FOOD HABITS: Mice and lizards make up the primary prey of desert massasaugas (Lowe et al. 1986). Holycross and Douglas (1996) identified 58 prey items from 51 desert massasauga from Cochise County, Arizona: lesser earless lizard (*Holbrookia maculata*, 13.8%), desert grassland whiptails (*Cnemidophorus uniparens*, 32.8%), southern prairie lizards (*Sceloporus undulatus consobrinus*, 27.8%), tree lizards (*Urosaurus ornatus*, 1.7%), small rodents (19.0%), and desert shrews (*Notiosorex crawfordi*, 5.2%). Centipedes (*Scolopendra*) are also eaten (A.T. Holycross, pers. comm. 2001).

HABITAT: In Arizona, the desert massasauga is found primarily in tobosa (*Hilaria mutica*) grassland along sloping bajadas with surface rocks (Holycross and Douglas 1996; Lowe et al. 1986). Populations in New Mexico tend to avoid rocky habitat (Degenhardt et al. 1996).

ELEVATION: The elevational distribution of the desert massasauga primarily ranges from 4,400 - 4,700 feet (1342 - 1434 meters) in the San Bernardino Valley (Lowe et al. 1986).

PLANT COMMUNITY: Desert grassland dominated by tobosa (*Hilaria mutica*).

POPULATION TRENDS: Quantified data are lacking, but the desert massasauga has almost certainly experienced long-term population declines and a general range contraction in Arizona. Lowe et al (1986) infer currently stable population along Highway US 80 based on fairly constant number of road kills observed (roughly several dozen per year).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS:	None
STATE STATUS:	WSC (AGFD, WSCA in prep) [SE AGFD, TNW 1988]
OTHER STATUS:	Forest Service Sensitive (USDA, FS Region 3 1999) [Forest Service Sensitive USDA, FS Region 3 1988] Determined Subject to Special Protection (Secretaria de Medio Ambiente 2000) [Determined Subject to Special Protection, Secretaria de Desarrollo Social 1994]

MANAGEMENT FACTORS: The subspecies occurs in the extreme western edge of its range and has a limited distribution in Arizona (Stebbins 1985). Its reduced range in Arizona is primarily due to habitat loss from agricultural development (Lowe et al. 1986). Alteration of the grassland habitat via overgrazing could further impact Arizona populations (Holycross and Douglas 1996). Highway mortality is a significant source of non-natural attrition (Holycross and Douglas 1996).

PROTECTIVE MEASURES TAKEN: Desert massasaugas may not be collected from the wild in Arizona (Arizona Game and Fish Commission Order 43).

SUGGESTED PROJECTS: Recommended projects include monitoring desert massasauga habitat quality and quantity, constructing diversionary drift fences along highways through its range, and investigate its population genetic structure (Holycross and Douglas 1996). Understanding the effects of grazing and grassland composition change would also be valuable.

LAND MANAGEMENT/OWNERSHIP: State Land Department and Private owned lands in Arizona. One record from the Fort Huachuca Military Reservation is of questionable validity (Holycross and Douglas 1996).

SOURCES OF FURTHER INFORMATION

REFERENCES:

- Arizona Game and Fish Department. 1988. Threatened Native Wildlife in Arizona. p. 11.
- Arizona Game and Fish Department. In prep. Wildlife of special concern in Arizona. Arizona Game and Fish Department Publication. Phoenix, Arizona. 32 pp.
- Baird, S.F., and C. Girard. 1853. Catalogue of North American reptiles in the Museum of the Smithsonian Institution. Part 1. Serpentes. Smithsonian Institution, Washington, DC.
- Behler, J.L. and F.W. King. 1979. The Audubon society field guide to North American reptiles and amphibians. Alfred A. Knopf, New York. pp.696-697.
- Campbell, J.A., and W.W. Lamar. 1989. The Venomous Reptiles of Latin America. Comstock Publ. Assoc., Ithaca, New York.
- Cochran, D.M. 1961. Type specimens of reptiles and amphibians in the US National Museum. Bull. US Natl. Mus. 220:xv + 291 p.
- Degenhardt, W.G., C.W. Painter and A.H. Price. 1996. Amphibians and Reptiles of New Mexico. University of New Mexico Press, Albuquerque. pp.356-357.
- Dept of the Navy 1962. Poisonous snakes of the world. p. 44.
- Ernst, C.H. 1992. Venomous Reptiles of North America. Smithsonian Institution Press, Washington, DC.
- Fowle, J.A., M.D. 1965. The Snakes of Arizona. Azul. Quinta Press, Fallbrook, California. p.132.
- Gloyd, H.K. 1940. The rattlesnakes, genera *Sistrurus* and *Crotalus*. Chicago Acad. Sci. Sp. Publ. #4:34-55.

- Goldberg, S.R., and A.T. Holycross. 1999. Reproduction in the desert massasauga, *Sistrurus catenatus edwardsii*, in Arizona and Colorado. Southwest. Nat. 44:531-535.
- Gotch, A.F. 1995. Latin Names Explained: A Guide to the Scientific Classification of Reptiles, Birds, and Mammals. Facts on File, New York. pp. 159-160.
- Holycross, A.T. 2001. *Sistrurus catenatus edwardsii* (desert massasauga). Maximum length. Herpetol. Rev. 32: *in press*.
- Holycross, A.T., and M.E. Douglas. 1996. Distribution, abundance, and ecology of the desert massasauga rattlesnake, *Sistrurus catenatus edwardsi*. Unpubl. report to the Arizona Game and Fish Department, IIPAM I93004, Phoenix, Arizona.
- Klauber, L.M. 1972. The Rattlesnakes. Vol. 1. Zool. Soc. San Diego. pp. 55-56, 553.
- Lowe, C.H. 1964. Amphibians and reptiles. *in* Lowe, C.H. (ed.). The Vertebrates of Arizona. University of Arizona Press, Tucson. p.172.
- Lowe, C.H., C. Schwalbe, and T.B. Johnson. 1986. The venomous reptiles of Arizona. Arizona Game and Fish Department. 115 pp.
- Minton, S.A. 1983. *Sistrurus catenatus*. Catalogue of American Amphibians and Reptiles 332.1-332.2.
- Secretaría de Desarrollo Social. 1994. Diario Oficial de la Federacion. p. 45.
- Secretaría de Medio Ambiente. 2000. Diario Oficial de la Federacion. p. 54.
- Shaw, C.E., and S. Campbell. 1974. Snakes of the American West. Alfred A. Knopf, New York. pp.217-218.
- Stebbins, R.C. 1985. A field guide to western reptiles and amphibians. Second edition, revised. Houghton Mifflin Company, Boston. pp. 225-226.
- USDA, Forest Service Region 3. 1988. Regional Forester's Sensitive Species List.
- USDA, Forest Service Region 3. 1999. Regional Forester's Sensitive Species List.
- Webb, R.G. 1970. Reptiles of Oklahoma. University of Oklahoma Press. pp.284-288.
- Wright, A.H., and A.A. Wright. 1957. Handbook of snakes of the United States and Canada. Vol. I. Comstock Publishing Associates, Ithaca, New York. pp.1042-1050.

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ADDITIONAL INFORMATION: Massasauga means "Great River Mouth" in the Chippewa language and probably alludes to the snake's habitat in Chippewa County: swampland surrounding mouths of rivers (Minton 1983). Gotch (1995) attributes the common name as a corruption of "Missisauga", the name of a river in Ontario. *Sistrurus* is derived from *sistrum* (Latin), which is itself derived from *seistron* (Greek), a small rattle. The specific epithet *catenatus* comes from *catena* (Latin), a chain, in reference to the chain-like pattern along the back (Gotch 1995). The patronym *edwardsi* honors L.A. Edwards, a US Army surgeon who collected the type specimen (Minton 1983).

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